No. 9400231

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Idaho Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT TY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

HARD RED WINTER WHEAT

'Bonneville'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 30th *day of* November *in the year of our Lord one thousand nine hundred and* ninety-four.

Attest:

Kenneth B. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Office, OIRM, Room 404-W, Washington, D.C. 20250; and to the Office of Management and Budget, Paperwork Reduction Project (OMB #0581-0055), Washington, 20250.
FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
University of Idaho
Idaho Agricultural Experiment Station (IAES)

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
ID0421

3. VARIETY NAME
Bonneville

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
University of Idaho
Moscow, ID 83844

5. PHONE *(Include area code)*
208-885-7173

FOR OFFICIAL USE ONLY

PVPO NUMBER
9400231

FILING
Date: 4/28/94
Time: ☐ A.M. ☐ P.M.

FEES RECEIVED
Filing and Examination Fee: $2,150 +
Date: 4/28/94 +
Certificate Fee: $250. —
Date: Nov. 2, 1994

6. GENUS AND SPECIES NAME
Triticum aestivum L.

7. FAMILY NAME *(Botanical)*
Gramineae

8. CROP KIND NAME *(Common Name)*
Hard Red Winter Wheat

9. DATE OF DETERMINATION
1985

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Land grant college

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Dr. Gary Lee
Director, IAES
University of Idaho
Moscow, ID 83844 208-885-7173

Dr. Edward Souza
University of Idaho Aberdeen R&E Center
PO Box AA
Aberdeen, ID 83210
PHONE *(Include area code)*: 208-397-4181

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

- a. [X] Exhibit A, Origin and Breeding History of the Variety.
- b. [X] Exhibit B, Novelty Statement.
- c. [X] Exhibit C, Objective Description of Variety.
- d. [X] Exhibit D, Additional Description of Variety.
- e. [X] Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. [X] Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____
- g. [ ] Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
☐ YES *(If "YES," answer items 16 and 17 below)* ☒ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____ .)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Edward Souza	Asst. Professor	4/18/94
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Gary A. Lee	GARY A. LEE, DIRECTOR IDAHO AG. EXPERIMENT STATION	4-18-94

Exhibit A.
Origin and Breeding History of the Variety

Bonneville is a hard red winter wheat selection from a 1981 cross, A81160W, with the parentage A774125W-16-3-1/A7470W-11-2. The breeding line A774125W-16-3-1 was derived from the cross of two sister lines with the pedigree Utah 216c-12-10/'Cheyenne'/5/PI 476212/4/'Burt'/3/'Rex'/'Rio'// 'Nebred'. The breeding line A7470W-11-2 had the pedigree: 'Kiowa'/Utah 222a-437-2//Dm/3/PI 476212/Montana 6619/4/'McCall'/'El Gaucho'/3/Kiowa/Utah 233-3-10/Burt. A81160W was advanced in generations by the bulk method through the F_2 and F_3 generations. In 1984, head selections were made in Preston, ID of plants resistant to dwarf bunt. Selected F_4 families were planted at Aberdeen and the selection A81160W-9 was harvested in 1985 and tested in southeastern Idaho yield trials for 4 yr. In 1989, A81160W-9 was designated IDO421 and entered into the Western Regional Nursery for 3 yr. Breeder seed of Bonneville was formed by selecting 200 heads from IDO421 in 1990 and the seed of those heads were purelined for 2 yr. No visible deviants from the true plant type have been observed in Bonneville from 1989 to 1993. Early seed stocks of Bonneville were observed to carry low frequencies of white seed. White seed has not been observed in current seed stocks, however, a frequency of 1 white seed per kilogram of seed is considered to be allowed within the cultivar description.

Exhibit B.
Novelty Statement

Bonneville is most similar in plant type to Survivor. Seed of Bonneville and Survivor can be readily distinguished by their high-molecular weight glutenin patterns when separated by SDS-polyacrylamide gel electrophoresis. Survivor carries at the Glu1A locus the '1' glutenin allele and the Glu1B locus the '7+8' glutenin allele. Bonneville carries the 2* allele and the '7+9' alleles at the Glu1A and Glu1B loci, respectively. Bonneville is significantly ($p<0.01$) taller, later maturing, and less prone to lodging than Survivor (see Table in section D., Performance of Bonneville hard red winter wheat in irrigated trials at Aberdeen).

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Idaho Agricultural Experiment Station

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
University of Idaho
Moscow, ID 83844

FOR OFFICIAL USE ONLY
PVPO NUMBER
9400231
VARIETY NAME OR TEMPORARY DESIGNATION

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:
[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:
[2] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____ [2] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:
[2][6][8] FIRST FLOWERING [2][7][3] LAST FLOWERING

4. MATURITY (*50% Flowering*):
[0][0] NO. OF DAYS *EARLIER* THAN ..... [5] 1 = ARTHUR 2 = SCOUT 3 = CHRIS
[1][2] NO. OF DAYS *LATER* THAN ..... [2] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (*From soil level to top of head*):
[0][7][9] CM. HIGH
[0][8] CM. TALLER THAN .. Manning ..... [ ]
[0][5] CM. SHORTER THAN . Weston ..... [ ] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):
[3] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:
[1] 1 = YELLOW 2 = PURPLE

8. STEM:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[2] Hairiness of last internode of rachis: Marginal Pubescence Only 1 = ABSENT 2 = PRESENT
[0][5] NO. OF NODES (*Originating from node above ground*)
[2] Waxy bloom: 1 = ABSENT 2 = PRESENT
[1] Internodes: 1 = HOLLOW 2 = SOLID
[2][2] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[1] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:
[1] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____
[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
[1][0] MM. LEAF WIDTH (*First leaf below flag leaf*)
[1] Flag leaf: 1 = NOT TWISTED 2 = TWISTED
[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
[2][4] CM. LEAF LENGTH (*First leaf below flag leaf*):

11. HEAD:

[1] Density: 1 = LAX 2 = DENSE

[2] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) _____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[1][0] CM. LENGTH [1][1] MM. WIDTH

12. GLUMES AT MATURITY:

[3] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[2] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[1] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE — Some apical florets oblique

[2] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE — Midwide

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[2] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[1] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[3] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[2] Cheek: 1 = ROUNDED 2 = ANGULAR

[3] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[–] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[0][6] MM. LENGTH [0][3] MM. WIDTH [4][3] GM. PER 1000 SEEDS

17. SEED CREASE:

[2] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[1] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] STEM RUST (Races) _____

[2] LEAF RUST (Races) PNW Races

[2] STRIPE RUST (Races) PNW Races

[0] LOOSE SMUT

[2] POWDERY MILDEW

[2] BUNT TCK

[2] OTHER (Specify) Typhula snow mold

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID (Bydv.) [0] GREEN BUG [0] CEREAL LEAF BEETLE

[ ] OTHER (Specify) _____

HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Neeley	Seed size	Neeley
Leaf size	Survivor	Seed shape	Neeley
Leaf color	Survivor	Coleoptile elongation	Survivor
Leaf carriage	Survivor	Seedling pigmentation	Survivor

USDA, ARS JUL 15 1994 Plant Variety Protection Ofc.

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

Exhibit D

Additional Description of Variety

Tables and Documents Included:

Tolerance of hard red winter wheats to snow mold in southeastern Idaho.

Milling and baking quality of IDO421 at Tetonia, Preston, and Rockland, Idaho, 1989, 1990, and 1991.

Dryland performance of Bonneville HRW in Southeastern Idaho, 1988 to 1993.

Performance of Bonneville HRW wheat in irrigated trials at Aberdeen, 1986 to 1991.

Western regional winter wheat quality evaluations for Bonneville, 1990 to 1992.

Yield performance of IDO421 in the Western Regional Hard Red Winter Wheat Nursery, 1990 to 1992.

Rust disease ratings for IDO421 in Western Regional Trials, 1991 and 1992.

Cereal Food Processors Quality Evaluation: IDO421 and Blizzard

FGIS report on IDO421 classification

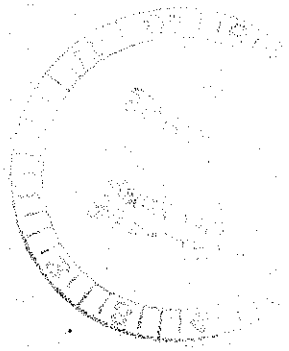
Tolerance of hard red winter wheats to snow mold in Southeastern Idaho.

Cultivar	Tetonia 1990	Tetonia 1991	Tetonia 1992	Tetonia 1993	Roy 1993	Preston 1993	Average
	%	%	%	%	%	%	%
Bonneville	21	52	54	16	53	48	41
Survivor	29	50	49	27	60	41	43
Blizzard	12	46	43	11	41	42	32
Manning	16	47	22	16	13	25	23
IDO444	10	73	57	19	43	54	43
IDO352	14		33	13	31	53	
IDO355HW		43	37			50	
IDO433	27	44	32	18		36	
Sprague	16		44		29		
Weston	13	42	39	11		25	
Average	18	50	41	16	38	41	36

Milling and Baking Quality of IDO421 at Tetonia, Preston, and Rockland, Idaho, 1989, 1990, and 1991.

Name	Flour[1] Protein	Milling Yield	Time to Mixograph Peak	Mixing Tolerance	Mix Time	Loaf Volume	Loaf Texture Score
	%	%	min	degrees	min	ml	0-5
IDO421	13.6	67	3.2	73	2.7	943	2.6
Manning	12.6	64	2.9	70	2.8	964	2.5
Blizzard	13.4	68	2.7	66	2.3	901	2.4
Survivor	13.2	68	2.4	67	2.0	890	2.8
Weston	13.6	64	1.7	59	1.6	984	2.3
IDO355 (HWW)	13.4	63	3.1	69	2.6	919	2.6
IDO433	12.5	64	2.5	73	2.3	940	2.3
IDO444[2]	13.2	68	3.4	74	2.6	840	1.8
IDO445 (HWW)	13.4	65	2.7	57	3.5	902	2.6

[1] Higher values preferred for all quality characters.
[2] Blizzard sister line.



Dryland performance of Bonneville HRW in Southeastern Idaho, 1988 to 1993

	Tetonia, 1988, 1989, 1991, & 1992				-- Preston, 1988 to 1993 --				Rockland, 1988 and 1990 to 1993				Dryland	Sum of	Finlay-Wilkinson stability	
Cultivar	Grain yield	std error	Test wt.	Spring stand	Grain yield	std error	Test wt.	Spring stand	Grain yield	std error	Test wt.	Spring stand	plant height	yield ranks all loc/yr	yield	test wt
	bu/ac		#/bu	%	bu/ac		#/bu	%	bu/ac		#/bu	%	in		beta	beta
Bonneville	54	2	61	58	29	1	60	70	34	1	59	85	30	5	0.77	0.08
Survivor	47	1	60	54	29	1	59	72	31	1	59	81	29	9	0.78	0.11
Blizzard	49	1	60	51	30	1	60	70	36	1	59	83	29	2	0.84	0.12
Sprague	48	2	60	54	29	2	58	74	35	2	59	77	26	6	0.36	0.92
Weston	47	1	62	52	30	1	61	67	33	1	60	88	32	8	0.83	0.39
Promontory	49	3	62	43	25	2	60	67	33	2	58	64	28	10	0.92	0.11
Manning	50	1	60	51	28	1	59	67	33	1	59	88	28	11	0.84	0.55
IDO444	51	3	61	65	32	2	60	78	39	2	59	81	28	1	0.88	0.34
IDO352	50	2	59	50	30	2	60	72	35	2	59	85	30	3	0.42	0.08
IDO443	57	2	61	55	29	2	60	75	34	2	60	84	28	4	0.71	0.04
IDO445	50	3	62	47	28	2	60	66	31	2	59	84	29	7	0.93	0.27
Average	50	2	61	53	29	1	60	71	34	1	59	82	29		0.75	0.27

9

9400231

Performance of Bonneville hard red winter wheat in irrigated trials at Aberdeen 1986 to 1991.

Name	Grain yield	Test weight	Heading date	Plant height	Straw strength	Lodging score
	bu/ac	#/bu	May 1+	in	1 to 5*	1 to 9*
Bonneville	85.2	62.6	45	43	3.5	2.6
Survivor	73.3	61.0	41	39	4.2	5.1
Blizzard	89.3	62.2	41	41	3.2	2.3
IDO433	89.6	62.6	38	43	4.2	4.8
Manning	88.2	62.0	38	38	3.9	2.9
Neeley	82.8	62.4	43	40	3.2	1.2
Sprague	77.9	59.8	38	34	4.6	7.2
Weston	81.9	62.9	37	43	3.5	2.0

* Lower scores preferred

Contrasts between Bonneville and Survivor

Trait	Unit	Difference	Sum of squares	p value
Heading	days	4.4	63.6	0.0126
Height	in	3.5	40.6	0.0013
Lodging	1 to 9	-2.5	21.1	0.0058

Western Regional Winter Wheat Quality Evaluations for IDO421, 1990 to 1992

Cultivar	Test weight	Udy mill hardness	Flour yield	Flour ash	Milling score	Flour protein	Bake absorption	Mix time	Loaf vol.	Bread crumb	----- Farinograph ----- absorp.	peak	stability
	#/bu	NIR unit	%	%	units	%	%	min	ml	unit	%	min	min
1992													
IDO421	61.1	77	64.8	0.32	75.4	11.4	68.7	3.4	950	3	66.0	11.3	9.6
Kharkof	59.0	52	63.6	0.32	71.9	11.7	65.7	2.2	875	4	64.6	5.6	5.7
Wanser	60.0	69	65.0	0.32	75.9	11.9	67.5	3.1	910	4	66.5	8.7	6.9
IDO355HR	59.9	76	60.6	0.34	69.1	10.9	66.7	3.5	925	5	64.6	13.4	9.1
OR840157	60.9	64	67.7	0.33	80.3	10.7	65.7	3.5	840	6	62.2	6.8	8.0
OR841708	57.8	80	64.8	0.36	72.9	10.3	65.8	2.3	815	6	65.4	4.7	4.5
1991													
IDO421	62.7	61	72.2	0.35	86.8	13.1	69.0	2.8	935	3	64.5	14.0	14.0
Kharkof	61.5	57	67.6	0.34	79.8	12.9	66.7	1.9	960	4	64.7	4.5	7.8
Wanser	62.8	70	70.7	0.34	83.6	12.5	66.7	2.2	980	4	67.5	7.4	11.0
IDO355HR	61.7	77	69.7	0.36	81.4	12.7	68.2	3.2	930	6	65.8	10.4	11.0
OR840157	62.0	54	70.7	0.37	83.0	11.3	66.7	3.3	875	6	63.2	6.8	10.2
OR841708	58.6	75	68.9	0.41	77.9	12.1	65.2	2.1	875	6	68.4	4.0	3.8
1990													
IDO421	62.6	76	70.8	0.34	87.2	13.7	66.1	4.3	925	3	67.1	12.5	12.0
Kharkof	60.9	63	68.1	0.40	80.1	14.3	65.1	2.6	965	3	69.6	5.5	6.0
Wanser	61.8	77	72.4	0.37	88.1	13.5	65.4	3.9	960	3	67.6	10.0	10.0
IDO355HR	61.0	76	67.3	0.37	78.1	13.8	67.8	3.9	975	3	67.5	12.2	13.5
OR840157	61.8	60	71.3	0.38	85.7	11.7	65.4	3.9	815	6	64.8	7.8	9.5
OR841708	58.3	77	68.6	0.41	80.9	12.9	64.8	2.9	865	4	70.4	5.3	7.3
Average													
IDO421	62.1	71	69.3	0.34	83.1	12.7	67.9	3.5	937	3	65.9	12.6	11.9
Kharkof	60.5	57	66.4	0.35	77.3	13.0	65.8	2.2	933	4	66.3	5.2	6.5
Wanser	61.5	72	69.4	0.34	82.5	12.6	66.5	3.1	950	4	67.2	8.7	9.3
IDO355HR	61.2	72	68.2	0.35	79.9	12.4	67.2	3.5	915	5	65.2	9.8	10.8
OR840157	60.5	65	68.9	0.37	80.5	11.1	66.0	3.2	835	6	64.5	6.4	8.1
OR841708	58.2	77	67.4	0.39	77.2	11.8	65.3	2.4	852	5	68.1	4.7	5.2

94002231

Yield Performance of IDO421 in the Western Regional Hard Red Winter Wheat Nursery, 1990 to 1992

Cultivar	----- Yield at All Locations ------			--- Yield at Sites Under 50 bu/ac ---			--- Yield at Sites Under 50 bu/ac ---			Stability across yield regimens
	No. of sites	Yield	Percent of Check	No. of sites	Yield	Percent of Check	No. of sites	Yield	Percent of Check	
	No.	bu/ac	%	No.	bu/ac	%	No.	bu/ac	%	
1992										
IDO421	15	59.8	115.4	4	34.0	111.5	11	68.6	115.3	0.84
Wanser	15	61.2	118.1	4	32.5	106.6	11	71.7	120.5	0.92
Kharkov	15	51.8	100.0	4	30.5	100.0	11	59.5	100.0	0.81
OR840157	15	65.5	126.5	4	26.8	87.7	11	79.6	133.8	1.24
OR841708	15	76.3	147.3	4	31.3	102.6	11	92.6	155.6	1.23
1991										
IDO421	13	70.4	111.6	3	35.7	123.5	10	80.7	110.1	0.93
Wanser	13	66.5	105.4	3	38.0	131.5	10	75.1	102.5	0.81
Kharkov	13	63.1	100.0	3	28.9	100.0	10	73.3	100.0	1.05
OR840157	12	51.9	85.8	3	27.7	95.9	10	60	84.4	0.89
OR841708	13	79.3	125.7	3	27.9	96.5	10	94.7	129.2	1.40
1990										
IDO421	14	58.8	93.6	6	34.8	91.3	8	76.8	113.4	0.80
Wanser	15	55.4	127.6	7	35.0	122.2	8	73.2	129.9	0.76
Kharkov	15	43.4	100.0	7	28.6	100.0	8	56.4	100.0	0.71
OR840157	13	77.8	172.9	5	25.4	94.9	8	110.5	196.0	1.58
OR841708	13	77.1	171.3	5	29.6	110.4	8	106.8	189.3	1.31
Average										
IDO421	42	63.0	106.9	13	34.8	108.8	29	75.4	112.9	0.86
Wanser	43	61.0	117.1	14	35.2	120.1	29	73.3	117.6	0.83
Kharkov	43	52.8	100.0	14	29.3	100.0	29	63.1	100.0	0.85
OR840157	40	65.1	128.4	12	26.6	92.8	29	83.4	138.1	1.24
OR841708	41	77.6	148.1	12	29.6	103.2	29	98.0	158.0	1.31

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Rust Disease Ratings for IDO421 in Western Regional Trials, 1991. to 1992.

	Stripe Rust Pullman, WA		Stripe Rust Walla Walla, WA Stage 3		Stripe Rust Walla Walla, WA Stage 7		Leaf rust Walla Walla, WA
	%	type	%	type	%	type	%
1992							
IDO421	0	0	0	0	0	0	10
Kharkof	1	5	30	5 & 7	40	2 & 5	10
Wanser	5	5 & 2	60	8 & 5	80	5	10
Weston	10	8	2	2	20	2	5
Batum	0	0	5	2	20	2 & 3	10
Stephens	1	2	10	2 & 5	30	2 & 3	30
Buchanan	1	2 & 5	1	2	5	2	20
1991							
IDO421	1	5			0	0	40
Kharkof	10	5 & 2			1	5	30
Wanser	10	2 & 5			2	5	10
Weston	10	5 & 8			0	0	5
Batum	-	-			0	0	5
Stephens	-	-			0	0	25
Buchanan	0	0			-	-	-

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CEREAL FOODS PROCESSORS
WESTERN REGIONAL LABORATORY
EXPERIMENTAL WHEAT REPORT

DATE 12/10/91

SOURCE U.OF IDAHO AT ABERDEEN ED SOUSA IDO421 HRW

WHEAT

MOISTURE	10.7
PROTEIN	14.5
TEST WEIGHT	61.2

FLOUR

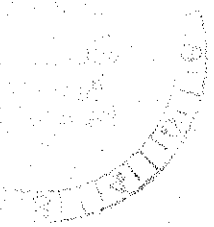
MOISTURE	13.5
ASH	
PROTEIN	

FARINOGRAM

ABSORPTION	61.8
ARRIVAL	3
PEAK	7.5
STABILITY	10.5
MTI	35

BAKE TEST

ABSORPTION	63.5
MIX TIME	8 MINUTES
LOAF VOLUME	3300 CC
INTERIOR	OPEN
REMARKS	GOOD STRENGTH AT 8 MINUTES MIX REASONABLY GOOD BAKING QUALITY



14

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CEREAL FOODS PROCESSORS
WESTERN REGIONAL LABORATORY
EXPERIMENTAL WHEAT REPORT

DATE 12/10/91

SOURCE U.OF IDAHO AT ABERDEEN ED SOUSA "BLIZZARD" VARIETY HRW

WHEAT

MOISTURE	10.3
PROTEIN	15.6 (12%)
TEST WEIGHT	58.6

FLOUR

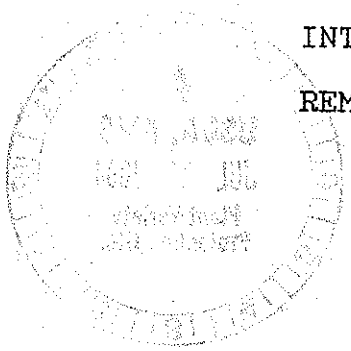
MOISTURE	13.0
ASH	
PROTEIN	

FARINOGRAM

ABSORPTION	63.3
ARRIVAL	3.4
PEAK	6.5
STABILITY	8.0
MTI	40

BAKE TEST

ABSORPTION	64.3
MIX TIME	6 MINUTES
LOAF VOLUME	3175
INTERIOR	VERY OPEN
REMARKS	NO TOLERANCE - WEAK AND STICKY



15

USDA, FGIS, QARD
Board of Appeals and Review
10382 N. Executive HiTTs Blvd.
Kansas City, MO 64153-1394

9400231

October 30, 1992

TO: Dr. Ed Souza
Aberdeen Experiment Station
P.O. Box AA
Aberdeen, Idaho 83210

FROM: Eurvin Williams, Chairman
Board of Appeals and Review

SUBJECT: Classification of the Variety IDO 421

Thank you for the sample(s) you submitted representing the variety IDO 421. Based on a review of the above mentioned sample(s) kernel and varietal characteristics, the Board of Appeals and Review (BAR) has determined the variety 1/ does meet the classing requirements for Hard Red Winter wheat.

Kernel characteristics include the color, shape, length of kernel and the shape of the germ, crease and brush.

Sample Evaluation:

Uniform in Characteristics	XXX	Yes		No
Favors Another Class		Yes	XXX	No
If yes, what class?				
Could Cause Marketing Problems		Yes	XXX	No

Other Comments:

Preston, Idaho (probable 1993 release)

Weight of Sample Submitted: 150 grams

1/ The above decision applies only to the quantity of wheat submitted for our review and does not apply to any other identified lots. The effect of environment on morphological characteristics may be significant and necessitate reevaluation.

cc: David Shipman

9400231

Exhibit E

Statement of Ownership

Bonneville was developed initially by the USDA-ARS and the University of Idaho, Aberdeen Research and Extension Center. The USDA-ARS Aberdeen wheat breeding program was transferred to University of Idaho in 1987. The University of Idaho tested IDO421 from 1987 to 1993 and produced breeders seed of Bonneville.